



Course Syllabus
Gyanmanjari College of Computer Science
Semester-4(BSC IT)

Subject: Operating System - BSCIT14312

Type of course: Major Core

Prerequisite: Linear and nonlinear data structures, working experience of any one structured programming language

Rationale:

An operating system is the core software of any computer system. This is the basic software or platform on which other software work. Every student of computer science and IT must therefore understand basic structure of an operating system. After learning this subject student will be able to discriminate between various types of operating systems, its processor, processes, and memory and file management. The subject also emphasis on Linux utilities and scripting.

Teaching and Examination Scheme:

Teaching Scheme				Credits	Examination Marks					Total Marks
CI	T	P	C	SEE		CCE				Total Marks
				Theory	Practical	MSE	LWA	ALA		
3	0	2	4	75	25	30	20	50	200	

Legends: CI-Class Room Instructions; T – Tutorial; P - Practical; C – Credit; SEE - Semester End Evaluation; MSE- Mid Semester Examination; LWA - Lab Work Assessment; V – Viva voce; CCE- Continuous and Comprehensive Evaluation; ALA- Active Learning Activities.

Course Content:

Sr. No	Course content	Hrs	% Weightage
1	Unit – I Operating System Concepts 1.1 Need of operating system 1.2 Evolution of operating system 1.3 Types Operating systems	07	20%



	<ul style="list-style-type: none"> a. Batch b. Multi programming c. Time Sharing d. Real Time e. Multitasking f. Multithreading <p>1.4 Operating System Services</p> <p>1.5 Case study</p> <ul style="list-style-type: none"> a. Linux b. Windows 		
2	<p>Unit – II Processor & Process Management</p> <p>2.1 Process and Process management</p> <ul style="list-style-type: none"> a. Programmers view of process b. Process Life Cycle/ Process States c. Process Control block <p>2.2 Process Scheduling</p> <ul style="list-style-type: none"> a. Process Scheduling Queues b. Schedulers c. Context Switch <p>2.3 Scheduling algorithms</p> <ul style="list-style-type: none"> a. First-Come, First-Served (FCFS) Scheduling b. Shortest Job First (SJF) c. Round Robin(RR) Scheduling d. Priority Scheduling e. Multiple-Level Queues Scheduling <p>2.4 Dead lock</p> <ul style="list-style-type: none"> a. Necessary Conditions for Deadlock b. Methods of Handling Deadlocks in Operating System 	11	20%
3	<p>Unit – III Memory Management</p> <p>3.1 Memory management</p> <p>3.2 Contiguous allocation</p> <ul style="list-style-type: none"> a. Single contiguous memory management schemes b. Multiple Partitioning <p>i. Fixed Partitioning</p> <p>ii. Dynamic Partitioning</p> <p>3.3 Non contiguous allocation</p> <ul style="list-style-type: none"> a. Paging b. Segmentation c. Virtual Memory 	09	15%
4	<p>Unit – IV File Management</p> <p>4.1 File management</p> <ul style="list-style-type: none"> a. User- view Vs. System view b. File Naming c. File Attributes d. File Operations 	07	25%



	e. File Structure 4.2 Directory structure 4.3 Disk Organization a. Physical structure b. Logical structure 4.4 Security and Protection mechanism		
5	Unit – V Linux Basics 5.1 Overview of Linux 5.2 Installation 5.3 Introduction to Linux shell basic and shell commands a. Directory Related Commands: pwd, cd, mkdir, rmdir b. File related Command: cat, cp, rm, in, is, chmod, wc, diff, cmp 5.4 shell scripts	11	20%

Continuous Assessment:

(For each activity maximum-minimum range is 5 to 10 marks)

Sr. No	Active Learning Activities	Marks
1	Hands-On with Linux OS: Research and compare different types of operating systems (Real-time OS, Distributed OS, Network OS, etc. and submit the case study on GMIU web Portal.	10
2	Selective Response: Students will be assigned a selective response-based test on GMIU web portal.	10
3	Scheduling Policy Analysis: Study different scheduling policies (preemptive vs. non-preemptive) and prepare a presentation or report and submit on GMIU web portal.	10
4	OS Analyze Project: students have to work in groups to explore and Analyze Linux and Windows operating systems. (Task: Installation, File System Comparison, Command-Line Interface vs. GUI, Package Management, Security Mechanismssubmit on GMIUweb portal)	10
5	Comparison: Compare and contrast various CPU scheduling algorithms. Prepare a document and upload it on GMIU Web Portal.	10
Total		50



Suggested Specification table with Marks (Theory):75

Distribution of Theory Marks (Revised Bloom's Taxonomy)						
Level	Remembrance (R)	Understanding (U)	Application (A)	Analyze (N)	Evaluate (E)	Create (C)
Weightage	25%	36%	14%	0	0	0

Note: This specification table shall be treated as a general guideline for students and teachers. The actual distribution of marks in the question paper may vary slightly from above table.

Course Outcome:

After learning the course the students should be able to:	
CO1	Analyze the structure of OS and basic architectural components involved in OS design
CO2	Compare and contrast various CPU scheduling algorithms.
CO3	Evaluate the requirements for the process synchronization and co-ordination in contemporary operating system.
CO4	Analyze various algorithms for memory management, I/O management and security aspects of operating system.
CO5	Develop shell scripts in Unix/Linux OS and write simple programs using kernel system calls. Also understand virtualization concept.

List of Practical:

Sr. No	Descriptions	Unit No	Hrs
1	Install & test different types of Operating System & compare its features.	1	2
2	Compare various process scheduling algorithm.	2	2
3	Test and run basic unix commands.	5	2
4	Test and run Advanced unix commands.	5	2
5	Test commands related with File editing with Vi, Vim, gedit, gcc.	5	2
6	Write a shell script to generate marksheets of a student. Take 3 subjects, calculate and display total marks, percentage and Class obtained by the student.	5	2
7	Write a shell script to find factorial of given number n.	5	2
8	Write a shell script which will accept a number b and display first n prime numbers as output.	5	2
9	Write a shell script which will generate first n fibonacci numbers like: 1, 1, 2, 3, 5, 13, ...	5	2
10	Create a Shell script to accept a string in lower case letters from a user, & convert to upper case letters.	5	2



11	Create a Shell script to find numbers of characters, words & lines of a given input file	5	2
12	Create a Script to reverse a string and display it.	5	2
13	Create a Script to check a string is palindrome	5	2
14	Write a shell script to read n numbers as command arguments and sort them in descending order.	5	2
15	Create a Shell script to read and display content of a file.	5	2
		Total	30

Instructional Method:

The course delivery method will depend upon the requirement of content and need of students. The teacher in addition to conventional teaching method by black board, may also use any of tools such as demonstration, role play, Quiz, brainstorming, MOOCs etc.

From the content 10% topics are suggested for flipped mode instruction.

Students will use supplementary resources such as online videos, NPTEL/SWAYAM videos, e-courses, Virtual Laboratory

The internal evaluation will be done on the basis of Active Learning Assignment

Practical/Viva examination will be conducted at the end of semester for evaluation of performance of students in laboratory.

Reference Books:

- [1] "Operating System Concepts" by Abraham Silberschatz, Peter B. Galvin, and Greg Gagne.
- [2]"Modern Operating Systems" by Andrew S. Tanenbaum and Herbert Bos
- [3] "Operating Systems: Internals and Design Principles" by William Stallings
- [4] "Operating Systems: Three Easy Pieces" by Remzi H. Arpaci-Dusseau and Andrea C. Arpaci-Dusseau

